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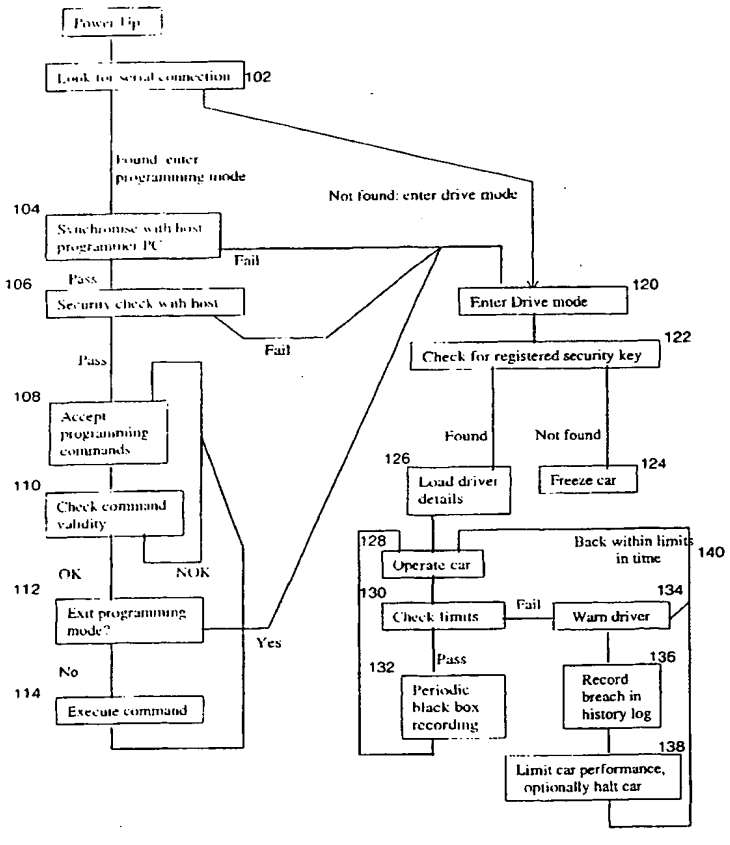
(54) Title: CUSTOMISABLE FOR VEHICLE PERFORMANCE CONTROL SYSTEM



(57) Abstract: A control and security system and method for vehicles, to allow specific criteria to be applied to operation by different drivers, which receives various inputs, for example road speed and engine RPM and interfaces with stored data specific to each authorised driver. Each driver must be identified to the vehicle, for example using an electronic key. Once authorised the system accesses data specific to each driver, which may include permitted speeds, time of use constraints, requirement to use a blood alcohol measurement device, or other limitations. The system also has outputs to devices to control vehicle performance or operation, for example a fuel flow control device or an engine immobiliser. If the conditions defined by the driver data are not met, then the system sends a signal to control vehicle performance - for example, to reduce vehicle speed.

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Customisable for Vehicle Performance Control System

Technical Field

The present invention relates to automatic control systems and methods for controlling the performance of a vehicle.

Background to the Invention

Vehicles such as cars and trucks play an important part in our day to day lives, and are used for such purposes as transporting goods, transporting animals, conveying groups of people from one place to another and conveying individuals. Such vehicles have become a necessity in today's times. However, they are also the cause of many crashes, often causing serious injury to people and sometimes death. Accordingly, while we cannot remove vehicles from our way of life, we can try to minimise the adverse effects by ensuring, as far as possible, that drivers drive safely.

Many attempts have been made to reduce the adverse effects of vehicle crashes. Examples of these include the use of airbags and better-designed vehicles. However, these only reduce damage after a crash has occurred.

A great many of these crashes arise through the driver driving in a reckless manner, particularly speeding. Attempts to prevent crashes in the first place include better driving education and stronger enforcement of road rules.

These approaches suffer from a number of disadvantages in that they do not actually force the driver to comply with the said rules and rely purely on the driver's attitude and self-discipline in complying with the driving requirements. Furthermore, while systems do exist which limit the speed at which a vehicle can travel (for example truck and bus speed limiting), these systems are not customisable to control a given performance parameter, able to restrict vehicle use to a limited number of designated drivers or customisable to a given driver, and are not able to take into account variations in traffic and environmental conditions.

Accordingly, it is an object of the present invention to provide a vehicle control system for controlling various performance parameters of a vehicle, and that is able to be customised for individual drivers and vehicles and to adjust to changes in the environment.

Summary of the invention

According to a first aspect of the present invention there is provided a vehicle control system including a processor, sensor inputs for receiving signals indicative of vehicle performance parameters, said parameters including at least vehicle speed and engine speed or RPM; and means for sending control signals to one or more performance control devices, said performance control devices including at least a speed controller; security means such as an electronic key for determining the identity of a driver; and one or more memory means for storing data relating to each driver;

Wherein when a driver attempts to operate the vehicle, said driver is required to identify himself to said security means, upon identification said processor having access to data in one or more of said memory means specific to said driver, so that in response to said sensor inputs and said data, said processor means selectively sends control signals to said performance control devices in order to limit the performance of said vehicle.

The system can also act as a security device, in that the vehicle cannot be driven unless an appropriate form of identification is presented to said security means. The system may be programmed to accept only certain identified drivers as valid drivers.

Preferably, the system can adjust the pre-programmed criteria in accordance with present traffic or environmental conditions, as sensed through one or more sensors.

The system may optionally be interfaced with a breathalyser unit to prohibit vehicle operation subject to the result of a breath analysis test. A further option is a time constraint module which limits a driver to operate at curtain times only.

The system may also act as a data logger for keeping a record of driving and other vehicle-related events occurring during a set period of time.

Preferably but without limitation, the control of the vehicle speed is by means of restriction of the flow of fuel to the engine.

The system is capable of having the programmed criteria and limits altered by use of external programming means (such as a program on a PC) to cover various drivers. The system contains security means which may limit access to these parameters to prevent them being altered without correct authority. This

may mean that only a licensed dealer can alter the parameters for one of the drivers: of use where the vehicle owner wishes to restrict another driver such as a child. Means are also included to prevent changes being made by other than a legally appointed authority such as a government roads authority or the Police when certain restrictions are in place. This may be used for instance to allowed a person convicted of speeding to continue driving subject to a court-imposed speed limit.

According to another aspect, the present invention provides a vehicle control system, including a processor, sensor inputs for receiving signals indicative of vehicle performance parameters, said parameters including at least vehicle speed and engine speed; and means for sending control signals to one or more performance control devices, said performance control devices including at least at speed controller; security means for determining the identity of a driver; and memory means for storing data relating to each driver;

Wherein when a driver attempts to operate the vehicle, said driver is required to identify himself to said security means, upon identification said processor means having access to said data in said memory means specific to said driver, so that in response to said sensor inputs and said data, said processor means selectively sends control signals to said performance control devices in order to limit the performance of said vehicle.

Brief Description of the Drawings

The invention will now be described with reference to the following drawings in which:

Figure 1 – is a system software flow chart showing the various options and features of the system of the present invention;

Figure 2 – shows a schematic of the system CPU and related input/output elements;

Figure 3 – shows the display of an opening screen of the software associated with the system;

Figure 4 – shows a screen allowing the owner to be identified.

Figure 5 – shows a screen for initialising the time of the system;

Figure 6 – shows a screen for allowing the technician to calibrate various vehicle performance parameter limits;

Figure 7 – shows a screen allowing the technician to set general vehicle parameters;

Figure 8 – shows a screen displaying key status and legal limits for all drivers;

Figure 9 – shows a screen allowing individual parameter limits to be set for individual drivers;

Figure 10 – shows a screen used by an authorised body such as a government roads authority to alter legally imposed restrictions;

Detailed Description of the Invention

It will be appreciated that the following description relates to a particular, preferred implementation. Alternative components, devices and approaches may be used within the general scope of the present invention.

The car control system of the present invention uses a microprocessor-based control unit which limits the performance of the vehicle. In accordance with the present invention, vehicle performance limits are programmed into the control unit by means of an RS-232 serial channel that allows communication between the control unit and a host computer, most likely a PC running under a windows environment. Alternately, performance limits pertaining to a particular driver may be stored in the security means used by each driver to identify himself to the system.

The control unit monitors the engine-RPM and the road speed of the vehicle and compares these values against preset values stored in the control unit, for up to 8 different drivers. Of course, the number of drivers need not be limited to 8 and may include as many drivers as desired.

The preset values programmed into the system can be tailored for each individual driver. The authentication of a given driver may be accomplished by a security key such as the DS1990A Serial Number i-button, available from DALLAS Semiconductor. This key provides individual identification of the person about to drive the vehicle; it may also contain performance limit data for that driver. Each authorised driver will be in possession of their own unique key. A licensed dealer or a government roads authority officer or Police officer may also have a special key allowing access to restricted parameters as previously described. However, any other suitable identification means could be used – for

example, a PIN pad; biometric means such as iris, face or fingerprint recognition; smartcards or similar devices.

The types of vehicle performance parameters which may be controlled include but are not limited to normal maximum road speed, normal maximum engine RPM, speed of the vehicle when in reverse, and reduced road speed and engine RPM for when the vehicle is being driven under hazardous conditions. The hazardous conditions aspect may for instance be used when the system senses that the vehicle headlights are on and/or the windscreen wipers are on, indicating either night-time or wet driving conditions. Other inputs are possible and included.

When an attempt is made to either program or drive the vehicle the presence of the means of identification is detected by the system and its data read. If the vehicle is to be programmed the security means may not be registered in the system. In this case security information must be provided to the car system to confirm that the programmer is legally entitled to perform the operations. Some of that security will be contained in the special program supplied to dealers or authorities.

If the car is to be driven the system then compares the security data with data stored in memory to identify the driver. If the driver is identified and allowed to drive, the performance limits for that driver are made active. As the vehicle is driven, the active performance limits are periodically compared with the vehicle performance in order to ascertain if the driver is exceeding his or her preset limits. It will be understood that alternative engine performance parameters could be used, for example, manifold pressure, or an output from an engine management system. For instance, in hybrid or electric vehicles, current flow could be used.

In the event that a preset limit is exceeded or violated the following actions may take place. At the beginning of the violation the driver is warned that his or her limits are being exceeded. The system warns the driver, via means such as a short audible tone and/or a visible signal such as a flashing light that a transgression is occurring, allowing corrective action to take place. If the transgression is still occurring after a short period of time, a grace period commences. During this grace period the driver is able to use the full performance of the vehicle in order that an emergency situation may be dealt with

(for example collision avoidance). During the grace period, the driver is warned by means such as described as above: the detailed format of the alarm may differ to alert the driver that the grace period has commenced. When the driver returns the vehicle behaviour to within permitted limits the alarms are silenced. When the total grace period has expired no further grace time is permitted. This blocks the driver from continued violations. This may optionally be indicated to the driver by the visual signalling device.

Once the grace period has expired the vehicle performance will be limited by the system using means described elsewhere In the event of any subsequent violations, no grace period is given, and the system will take over control of the vehicle immediately. The grace period function may be reinstated by pulling the car over to the side of the road, stopping the engine for a pre-set ("cooling off") time and then restarting the engine.

For safety reasons it is desirable to provide the feature of allowing the driver to exceed a pre-set limit if that violation is quickly redressed. These are "quasi-violations" which may happen quite innocently on road trips. The present system allows for a number of "quasi-violations" to occur before the system restricts the driver as described above. A "quasi-violation" may be one which lasts for a brief (programmable) period of time (such as up to five seconds) and is not recorded by the data logger as a violation.

The control of the vehicle itself is achieved by means of a restriction of the flow of fuel to the engine or other suitable intervention which causes the vehicle to slow down. This may include providing signals to the normal engine control system.. The vehicle may be started in order to warm the engine prior to driving, but may not be driven away without valid driver identification. In effect, this system also acts a vehicle immobiliser improving the security of the vehicle.

The programmed parameters may be changed at any time using a suitable authorised program running on an external computer such as a PC, unless a particular driver has been "write protected". This write protection may be used in instances where, for example, a person has had imposed upon them a legal order. An example of a legal order may be that the person not be able to drive unless they have a blood alcohol level below a designated level, or that they are not allowed to exceed a given speed limit or drive outside certain hours of the

day. The system may be programmed ("write protected") such that only authorised persons may modify the program parameters. These may include the police or road transport authorities.

In the time constraint feature of the present invention, there is provided the ability to restrict an individual drivers' use of the vehicle on a time basis. That is, that a particular driver may only be able to drive the car during a certain "time window", for example from 7am to 6pm Monday to Friday. The constrained driver would be unable to start the vehicle outside of these times. Of course, for safety's sake, if the vehicle is being driven as the time window closes, the vehicle will not stop. However, once turned off, it will not be able to be started again by that person until the next time window opens.

Another feature of the present invention is its ability to provide a record of vehicle behaviour. This may take several forms such as an event history log and a "black box" recorder log. When the vehicle is started, an entry is made in the event history log providing an identification of the person who started the vehicle and when this occurred. This log can also record when and who programs or changes the parameter limits in the system. Furthermore, when any pre-programmed limits have been exceeded an entry is made as to who caused this violation and when. Further details such as road speed and engine RPM as well as the status of the headlights and windscreen wipers may be also recorded. If the driver continues to drive in violation of their given preset limits, an entry may be made only once per minute for instance in order not to use up valuable memory resources. The vehicle history log may hold a large number of such records at any one time and may act as a first in, first out buffer such that the most recent records are maintained. Another log records time, RPM and road speed while the vehicle is moving. This "black box flight recorder" logs record many hours of driving history. This is also a first-in first-out memory. Both memories are non-volatile RAM and will not be erased on power off, but may be read by a suitably programmed external computer.

It is envisaged that the system will be sold as a kit which can be installed by any appropriate technician. Reasonably skilled owners may also be able to perform such installations. Installation instructions and general information relating to the system, together with the programming software may be provided

on a CD or other suitable storage medium. It is also envisaged that the system may be fitted during manufacture of the vehicle.

Figure 1 is a flow diagram of the software used to implement one embodiment of the system. Two main streams of software are shown: the appropriate one is selected at power up according to whether a serial connection to the host is detected at step 102. If it is, the system attempts to establish a synchronised handshake communication with the host program, in step 104. Failure here causes the software to revert to drive mode 120. If synchronous communication can be established, a security check 106 is then run to see if the person attempting to program the unit is authorised. This would normally involve reading the current security key inserted into the security key socket 208. This key might belong to an owner or a licensed dealer, for example. An ordinary user key would not be accepted. Again, a failure here causes the operation to revert to the drive mode 120.

If there is success the host program may then issue commands to the system, which will accept them in step 108, check their validity in step 110 and attempt to execute them in step 114. However, if the command was to exit the programming mode, as shown in step 112, operation will again revert to Drive Mode 120. Otherwise a successful execution takes the system back to step 108, ready for the next command.

If the system enters Drive Mode in step 120, it first checks for a registered security key in step 122. A failure here results in the car being frozen in step 124. The only thing a user can do from here is to turn the car off: this is an anti-theft feature.

If the key found is registered, the appropriate driver details are loaded in step 126, after which the car may be driven in step 128 – subject to any programmed restrictions such as those involving the breathalyser or the time check. Once in motion, the system regularly checks the vehicle performance in step 130 for compliance with driver restrictions. If these are met the system continues as shown, with periodic black box recording of operation in step 132. The recording 132 may not necessarily occur every time the limits are checked in step 130.

If the limits are exceeded the driver is warned in step 134. If the driver takes corrective action quickly, as shown in path 140, the system may continue. If the action is not fast enough a violation record may be made in the history log file in step 136, and if the violation is severe enough the vehicle performance will be limited in step 138. Despite this the car may continue to be operated as shown.

It will be understood that this flow diagram does not cover all possibilities for fault detection and corrective action which would normally be expected in a computer program.

Figure 2 shows the layout of the system, preferably implemented using a microprocessor 202. Vehicle speed is monitored through interface 204, engine speed through interface 206, headlight state through interface 210, windscreen wiper state through interface 212 and reverse gear selected through interface 228. The means of identify a driver is implemented in interface 208: this may use an electronic key or other means as previously described. The optional breathalyser is shown at 214 and the optional clock/timer for time constraint restrictions at 226. The program memory is considered to be part of the CPU 202, but the storage of user data and vehicle logs may be done using non-volatile memory or battery-backed memory at 218. Alarm outputs are shown at 220 for an acoustic sounder, and at 222 for a visual signalling device. Vehicle performance limitations are activated through the output 224.

Figure 3 shows various aspects of the initial or Main programming screen as implemented on an external host computer such as a PC using a windows based environment. The Main screen shows the opening title together with click-buttons to access the various aspects of the system. The various aspects which are accessible through this screen include establishing a synchronised connection 302 with the car system (as in step 104), recording owners details 304, programming the vehicle details 306 as in step 108, saving the owner details to a disk file in step 308, and exiting from the host program in step 310, also as in step 112. Various installation instructions may be accessed in 312. Technical debugging information may be accessed where appropriate in step 314, although this option would not normally be presented for security reasons. Specialised or privileged access may be granted to appropriate authorities such as a government roads authority for adding or removing legal restrictions on the driver

behaviour may be done through 316. Again, unless the current user is identified during connection at 302 as being authorised to perform such restricted programming functions, this option would not be shown. In special circumstance security information may be shown at 318. Any informative or error messages would appear at 320.

Figure 4 is reached through button 304 and shows the entry of some of the owner details in 402 and 404. Buttons 406 and 408 allow the user to advance to the next screen or go back to the previous screen. Another similar screen covers vehicle details.

Figure 5 starts the programming sequence reached through button 306. The person doing the programming may be identified using a name entered in text box 502. The PC host system time is automatically shown in area 508. The car system time may be read with button 504, and the results appear in area 510. Clicking on button 506 causes the PC date and time to be sent to the car system to update it.

Figure 6 shows the next step in programming the car system. Since engine speeds can vary widely, from small racing motor cars to large earthmoving diesel machinery, the user has the option of selecting the appropriate RPM range in 602 by clicking on one of the mutually exclusive buttons shown there. This selection is then programmed in to the car system using the program button 604. Once this is done the car may be run at various engine and wheel speeds to calibrate the tachometer input 206 in area 606 and the speedometer input 204 in area 608. The engine may for instance be run at each of 1000, 2000 and 3000 RPM, as selected by the buttons thus labelled, and the car system instructed to record the corresponding inputs. Suitable analysis of the input pulse rates, as instructed by the check calibration button 614, will give a conversion factor from input tachometer pulses per second to engine RPM. The calibration factor is then shown in area 610. Similar steps are taken to calibrate the speedometer inputs through area 608. When suitable calibration factors have been obtained the car system is instructed to record them using button 616.

Figure 7 shows the programming of general vehicle performance limits, such as fuel cuts back in @ engine speed 702, maximum permitted reverse speed 704, total grace period for violations 706, alarm periods 708 and 710, delay

before a transgression or violation starts to be measured, and the cooling off period required with the engine off before a new grace period can be started. Other parameters may be added to this screen to allow for other options: the list shown is not limiting.

Figure 8 illustrates the programming of the individual security keys. For commercial reasons a limit may be placed on the number of security keys available for a system: this is entered into text box 802 and programmed into the car system with button 804. Clicking on any of the numbered buttons 806 will activate that particular set of data. However, if the key selected is beyond the number allowed the button may not respond to the click. Such a button may be shown greyed out to remind the programmer that it is not available. Equally, the button for a key which has been write locked against further changes would not respond and may be shown a different colour as a reminder. The user name is entered into text box 808. The tick boxes 810 show when a particular key has been programmed using the button 820: for this to be done the appropriate user key must first be in the security key socket 208, as the security identification data from that key is now recorded. A key may be activated at this stage using tick box 812, or it could be deactivated to temporarily stop the holder of that key from driving the vehicle. Three further flags or options are shown here: to activate the breathalyser and time requirements though tick boxes 814 and 816, and to write lock the information controlling that key. Some or all of these latter options may be set by a dealer on instruction from an owner or from a court, but only a suitable legal authority such as a government roads authority or the police might be allowed to undo these settings. Other flags controlling the driver behaviour are obviously possible here.

Figure 9 shows the specification of various parameters, as opposed to simple flags, to control or limit a driver's behaviour. The key selection buttons 902 are similar to buttons 806, and the user name areas 904 only serve to remind the programmer of who has which key. A user may have a general speed limit imposed through text box 906 and a general RPM limit imposed through text box 908. A speed limit for hazardous conditions may be imposed through text box 910 and a matching RPM limit imposed through text box 912. Hazardous conditions apply for instance when the headlights are sensed as being on through interface

210, implying night-time. Where a key holder is trusted to drive carefully he may be allowed to ignore the speed and RPM limits if tick boxes 914 and 916 are ticked. When the results for a key are satisfactory they are programmed into the car system with the program button 920. Once a key has been programmed the vehicle may be tested for those limits by clicking on the Test button 918. This allows the vehicle to be driven and limits exceeded to confirm that the alarms will sound appropriately. If this is done the log files may not record the transgressions or may flag them as being in test mode. Exit from this test mode returns to this screen. It may be noted that one cannot reach this screen without having a suitable security key: a limited driver could not invoke this option.

Figure 10 shows the screen reserved for a trusted authority such as a government roads authority. Accessing this screen may be the only way of removing the legal restrictions imposed elsewhere: access would therefore normally require further security measures such as a special security key and a password. Various methods of implementing this are known to those skilled in computer security. A Global Write Lock 1002 may be placed on the whole vehicle, prohibiting any changes being made by any one else. This might for instance be invoked when the owner himself is subject to a court-imposed restriction. The key selection through buttons 1004 is as for other screens. The state of the various restriction flags 1008 – 1014 are shown and may be altered from this screen.

It will be appreciated that the above description has been given in relation to a preferred embodiment only, and is not meant to be limited to the specifics of the disclosure which may vary in many ways as would be understood by the person skilled in the art, within the scope of the present invention.

CLAIMS

1. A vehicle control system, including a processor, sensor inputs for receiving signals indicative of vehicle performance parameters, said parameters including at least vehicle speed and engine load or speed; and means for sending control signals to one or more performance control devices, said performance control devices including at least a speed controller; security means for determining the identity of a driver; and memory means for storing data relating to each driver;

Wherein when a driver attempts to operate the vehicle, said driver is required to identify himself by said security means, upon identification said processor means having access to said data specific to said driver in said memory means, so that in response to said sensor inputs and said data, said processor means selectively sends control signals to said performance control devices in order to limit the performance of said vehicle.

2. A vehicle control system according to claim 1, wherein said data relating to said driver includes one or more parameters selected from the group comprising permitted performance parameters of the vehicle, and time of operation of the vehicle.

3. A vehicle system according to claim 1 or claim 2, wherein the control system includes sensor inputs relating to road, traffic or environmental conditions, and the processor is further responsive to such inputs in sending control signals to said performance control devices.

4. A vehicle control system according to any one of claims 1 to 3, wherein said system receives a further input from a device responsive to blood alcohol levels, so that for a selected one or more drivers, an input indicating a blood alcohol level below a predefined level is required before said control system permits operation of said vehicle.

5. A vehicle control system according to claim 2 or claim 4, wherein said system includes a clock, and said data for one or more drivers includes a time of

use period, so that said control system will not permit operation of said vehicle to commence unless the time of commencement is within the time of use period, if any, for said driver.

6. A vehicle control system according to any one of the preceding claims, wherein said system maintains one or more logs of vehicle use.

7. A vehicle control system according to claim 6, wherein said logs are stored within non-volatile memory on a rotating basis, so that in the event of a crash, said data can be recovered.

8. A vehicle control system according to claim 6 or claim 7, wherein said log includes at least said received sensor inputs, the identity of the driver, and time information.

9. A vehicle control system according to any one of the preceding claims, wherein said data specific to each driver is only able to be altered by an authorised person.

10. A vehicle control system according to claim 1, wherein said security means is a coded electronic key which interacts with a sensor in said vehicle to identify the driver.

11. A vehicle control system according to claim 1, wherein said or one of said performance control devices prevents operation of said vehicle.

12. A vehicle control system according to claim 11, wherein one of said performance control devices limits vehicle speed directly or indirectly.

13. A vehicle control system according to claim 12, wherein vehicle speed is controlled by restricting fuel flow to said vehicle.

14. A vehicle control system according to any one of the preceding claims, wherein said processor permits some or all of the criteria determined by said driver data to be exceeded for certain time periods and/or certain numbers of incidents without sending control signals to said performance control devices in order to limit the performance of said vehicle.

15. A vehicle control system according to claim 8, wherein said log further records incidents wherein control signals are sent to said performance control devices in order to limit the performance of said vehicle.

16. A vehicle control system according to any one of the preceding claims, wherein said system further includes means to provide a notification to the driver in the event that some or all of the criteria determined by said driver data are exceeded.

17. A method of controlling vehicle operation, said vehicle including a processor, sensor inputs to said processor for receiving signals indicative of vehicle performance parameters, said parameters including at least but not limited to vehicle speed and engine speed; and means for sending control signals to one or more performance control devices, said performance control devices including at least but not limited to a speed controller; security means for determining the identity of a driver and preventing operation of said vehicle unless said driver is identified; and memory means for storing data relating to each driver, said method including at least but not limited to the steps of:

(a) said driver identifying himself by said security means;

(b) said processor then accessing data in said memory means specific to said driver;

(c) said processor receiving signals indicative of vehicle performance vehicle performance parameters, and responsive to preloaded software, said signal, said data specific to said driver and optionally further inputs, determining whether the performance parameters are required to be altered, this step being iteratively repeated during the operation of the vehicle;

(d) If said processor determines in step (c) that the performance parameters need to be altered, sending a control signal to one or more of said performance control devices.

18. A method according to claim 17, wherein said data specific to said driver includes one or more parameters selected from the group comprising permitted performance parameters of the vehicle, and time of operation of the vehicle.

19. A method according to claim 17 or claim 18, wherein the control system includes sensor inputs relating to road, traffic or environmental conditions, and the processor is further responsive to such inputs in sending control signals to said performance control devices.

20. A method according to any one of claims 17 to 19, wherein said processor receives a further input from a device responsive to blood alcohol levels, so that in step (c), for a selected one or more drivers, an input indicating a blood alcohol level below a predefined level is required, or said processor will not permit operation of said vehicle.

21. A vehicle control system according to claim 18 or claim 20, wherein said system includes a clock, and said specific data for one or more drivers includes a time of use period, so that in step (c), said processor will not permit operation of said vehicle to commence unless the time of commencement is within the time of use period, if any, for said driver.

22. A method according to any one of claims 17 to 21, wherein logs of vehicle use for each driver are maintained.

23. A method according to claim 22, wherein said logs are stored within non-volatile memory on a rotating basis, so that in the event of a crash, said data can be recovered.

24. A method according to claim 22 or claim 23, wherein said logs include at least said received sensor inputs, the identity of the driver, and time information.

25. A method according to any one of claims 17 to 24, wherein said data specific to each driver is only able to be altered by an authorised person.

26. A method according to claim 17, wherein said or one of said performance control devices prevents operation of said vehicle.

27. A method according to claim 26, wherein one of said performance control devices limits vehicle speed directly or indirectly.

28. A method according to claim 27, wherein vehicle speed is controlled by, but not limited to, restricting fuel flow to said vehicle.

29. A method according to any one of the preceding claims, wherein some or all of the criteria determined by said driver data are permitted to be exceeded for certain time periods and/or certain numbers of incidents without sending control signals to said performance control devices in order to limit the performance of said vehicle.

30. A method according to claim 24, wherein said logs further record incidents wherein control signals are sent to said performance control devices in order to limit the performance of said vehicle.

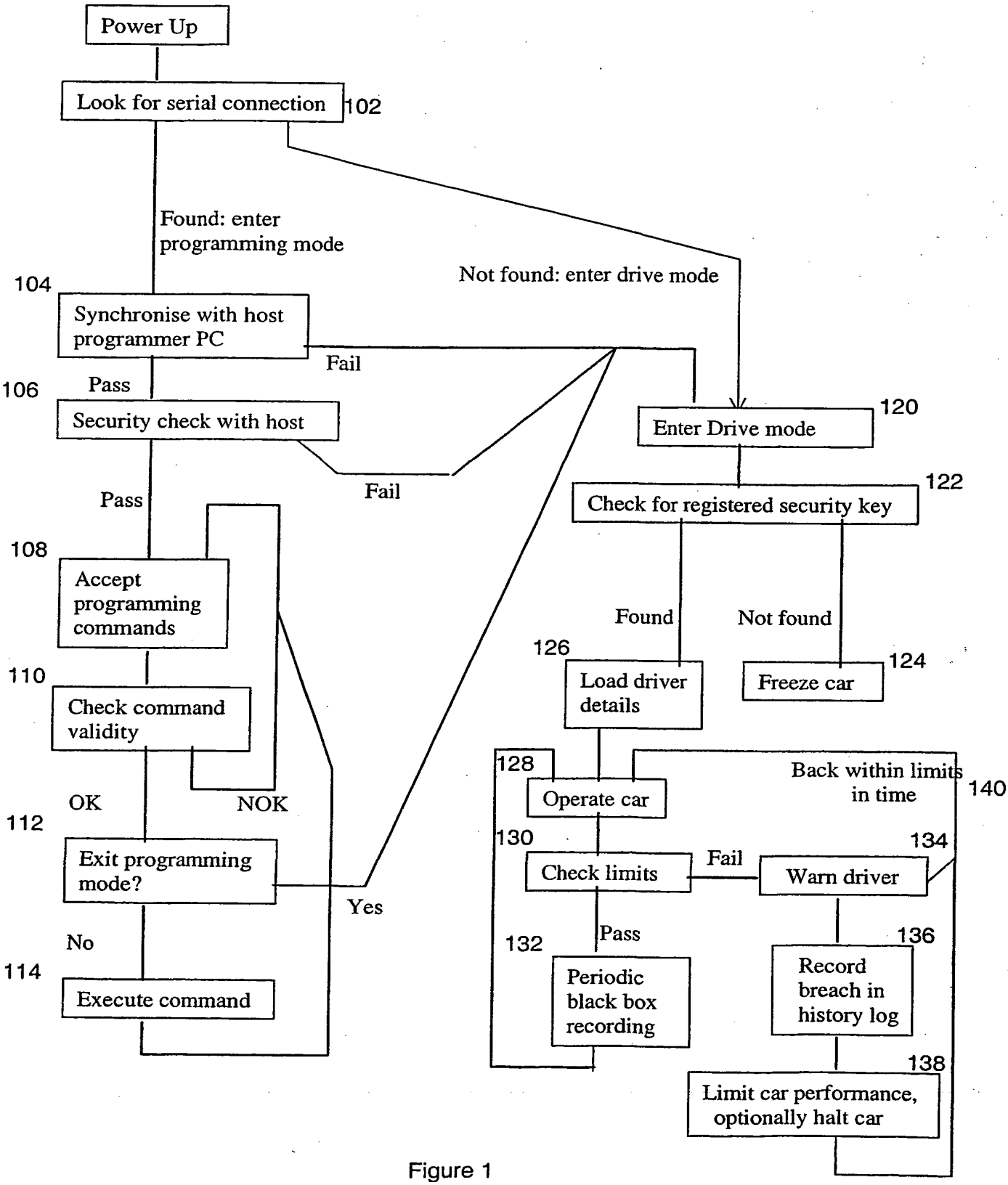

Figure 1

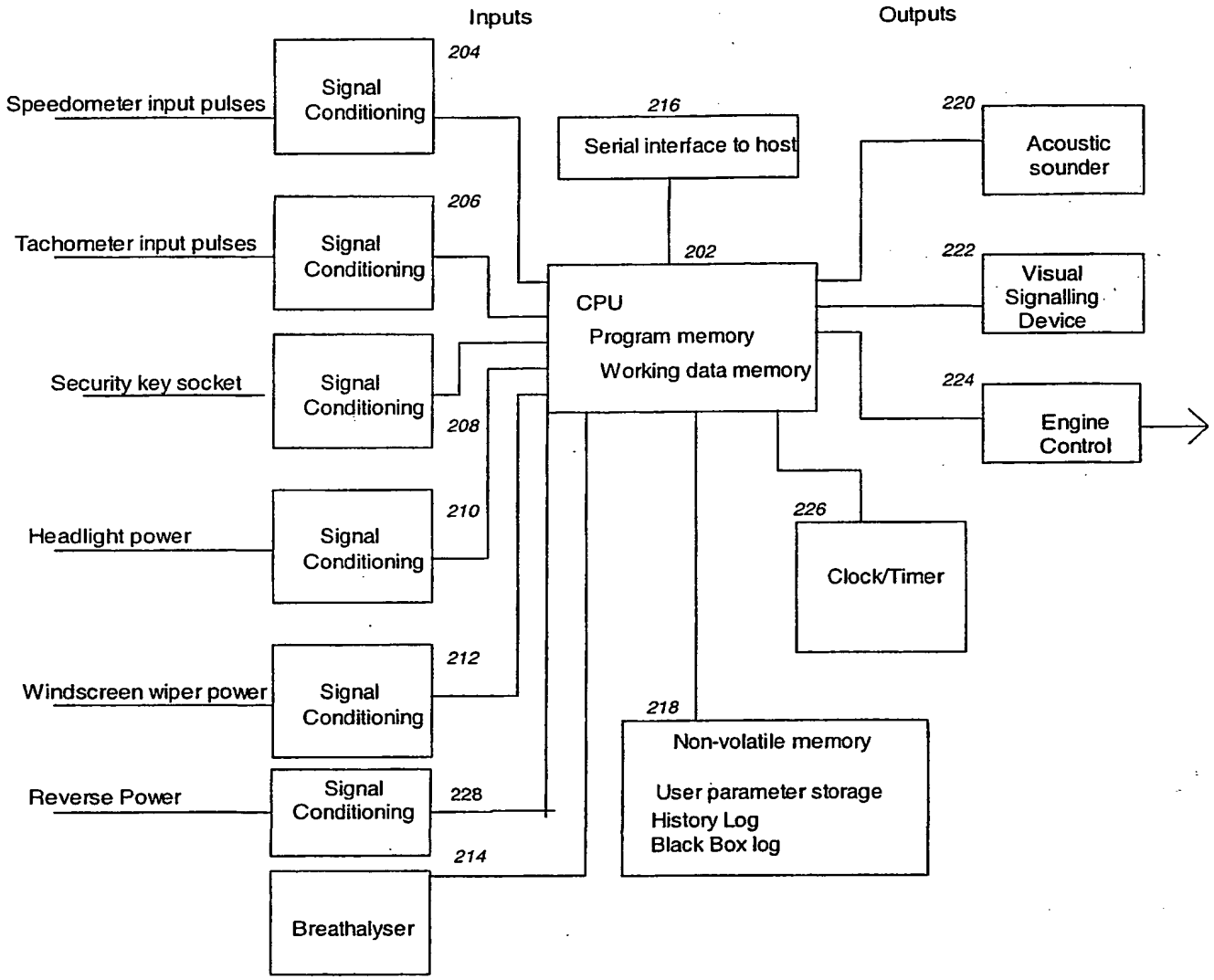

Figure 2

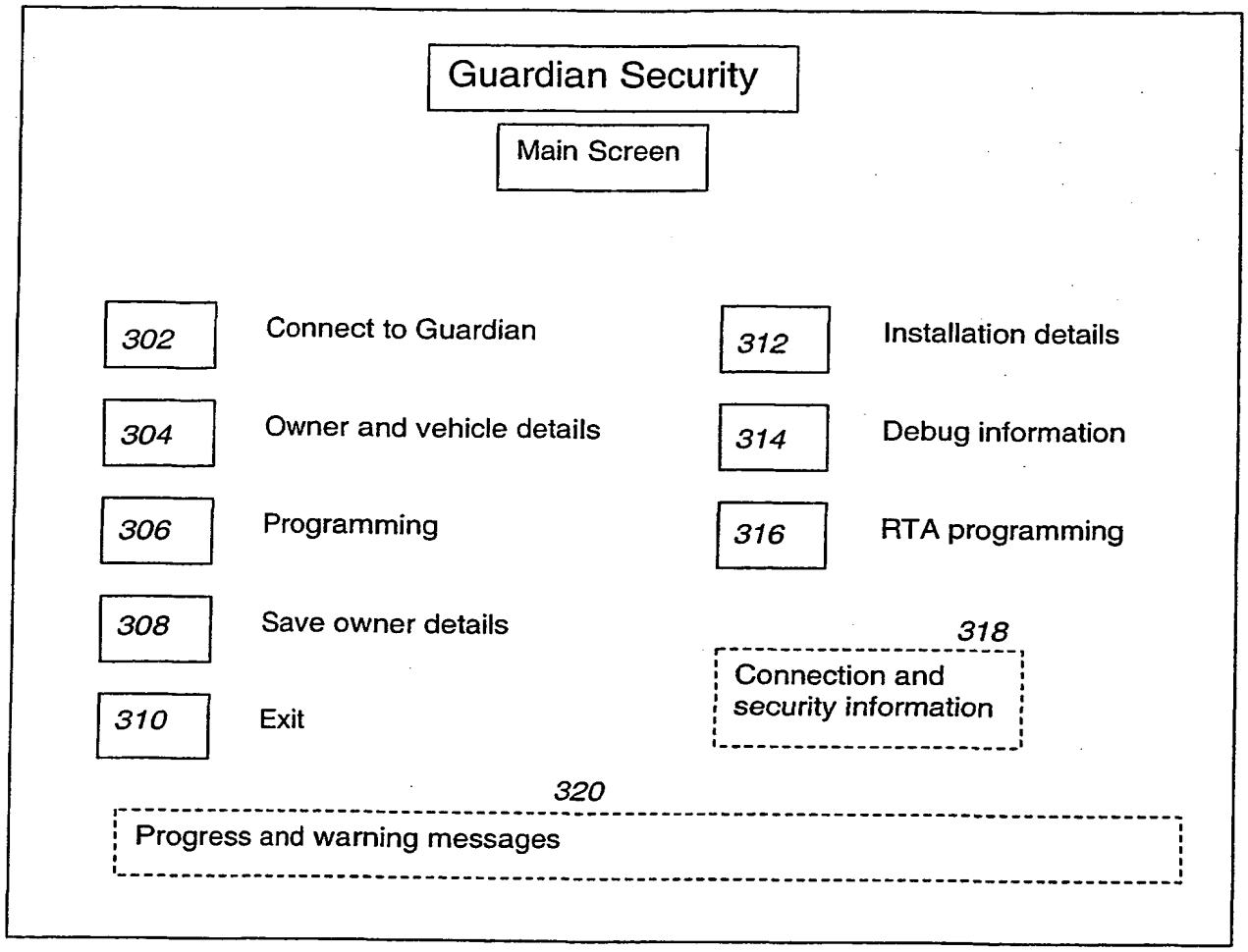

Figure 3

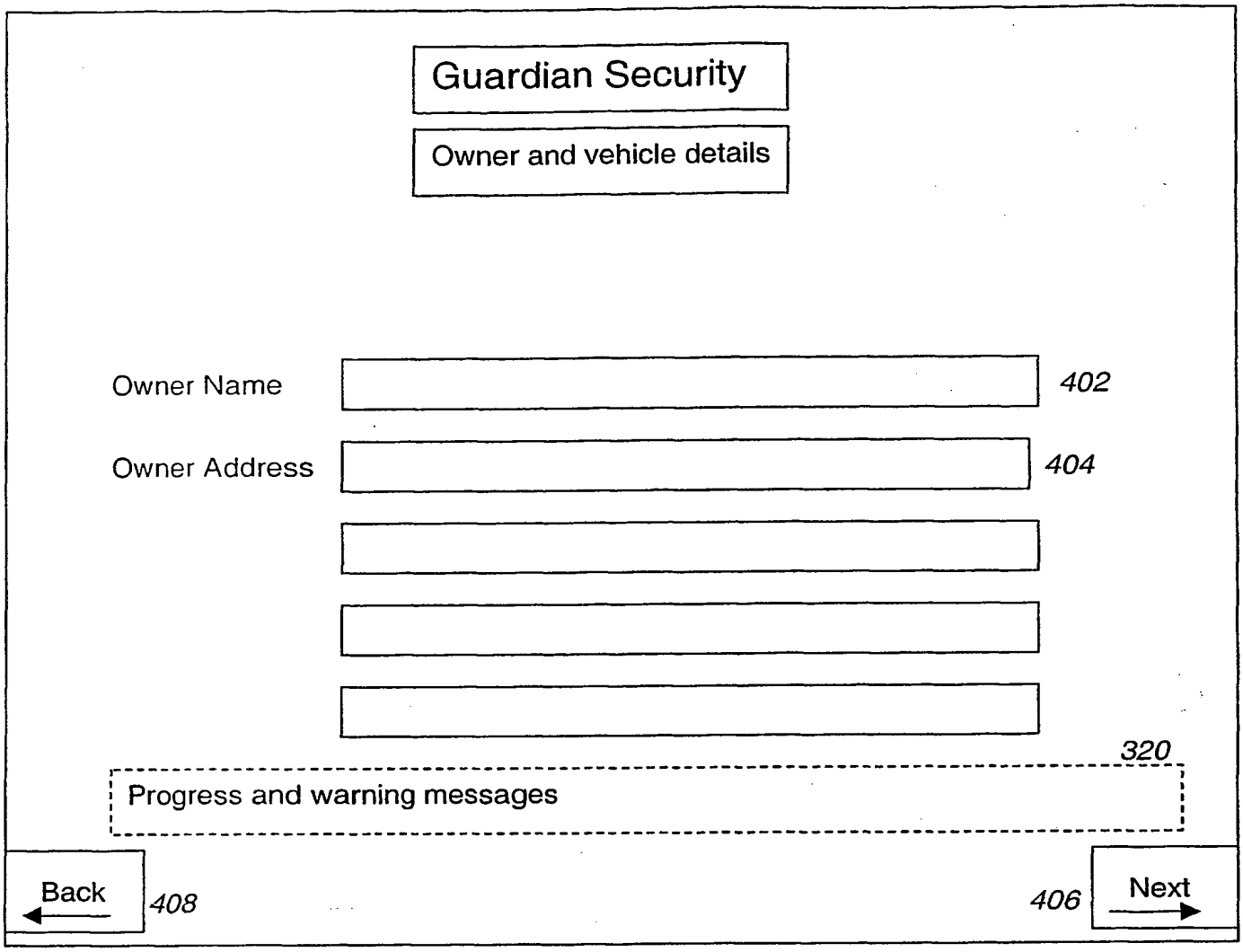
Guardian Security
Owner and vehicle details
Owner Name
402
Owner Address
404
320
Progress and warning messages
Back
408
406
Next

Figure 4

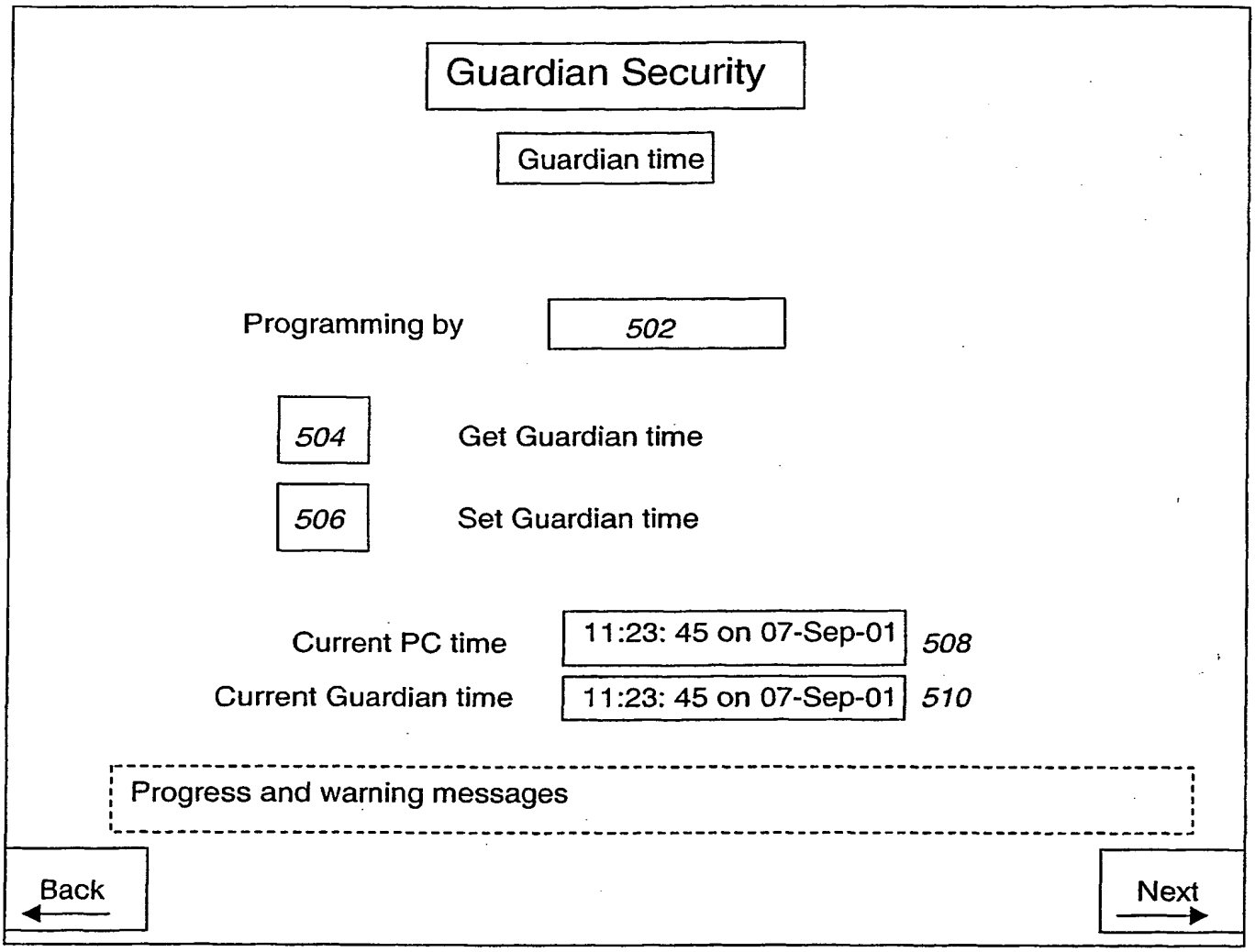

Figure 5

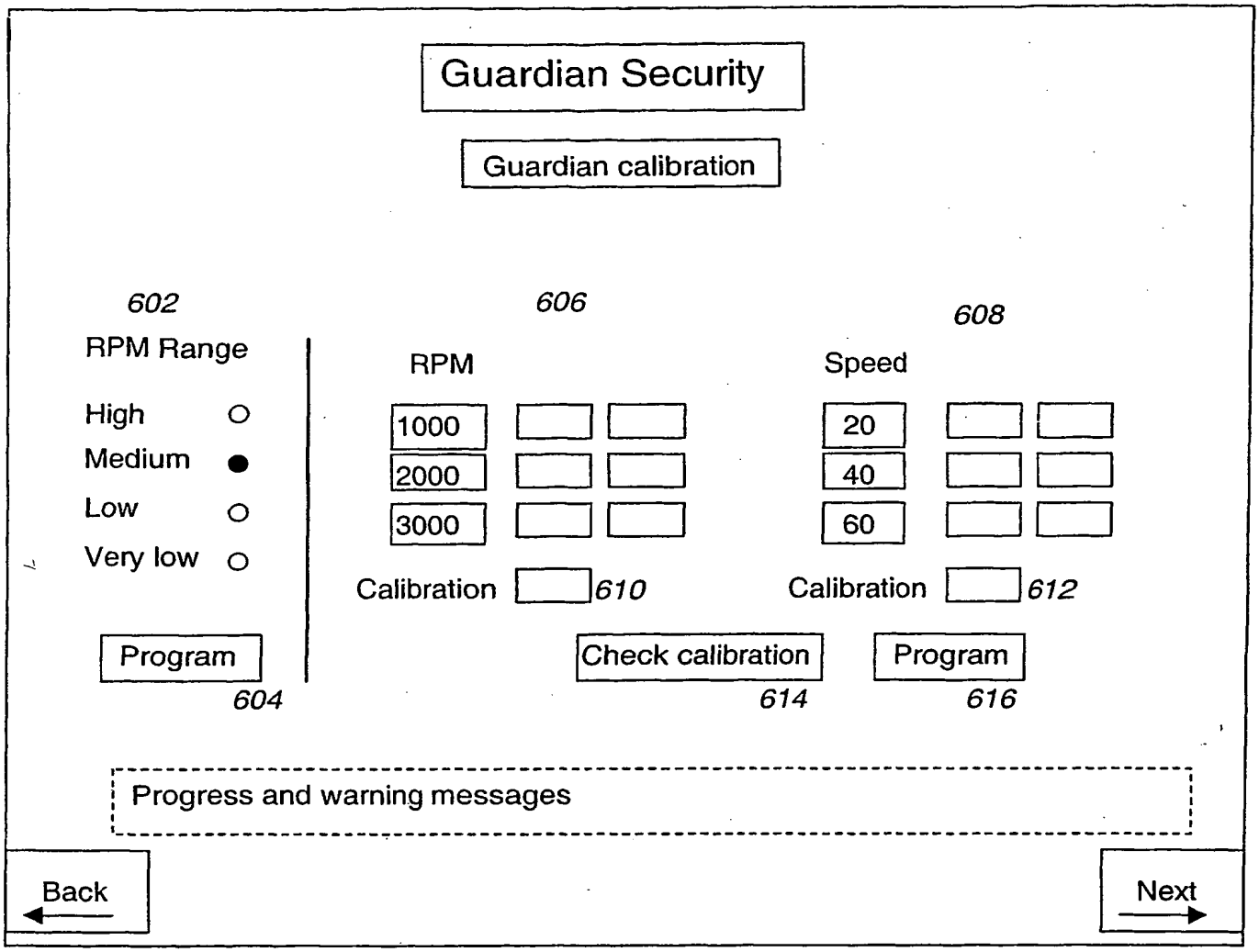

Figure 6

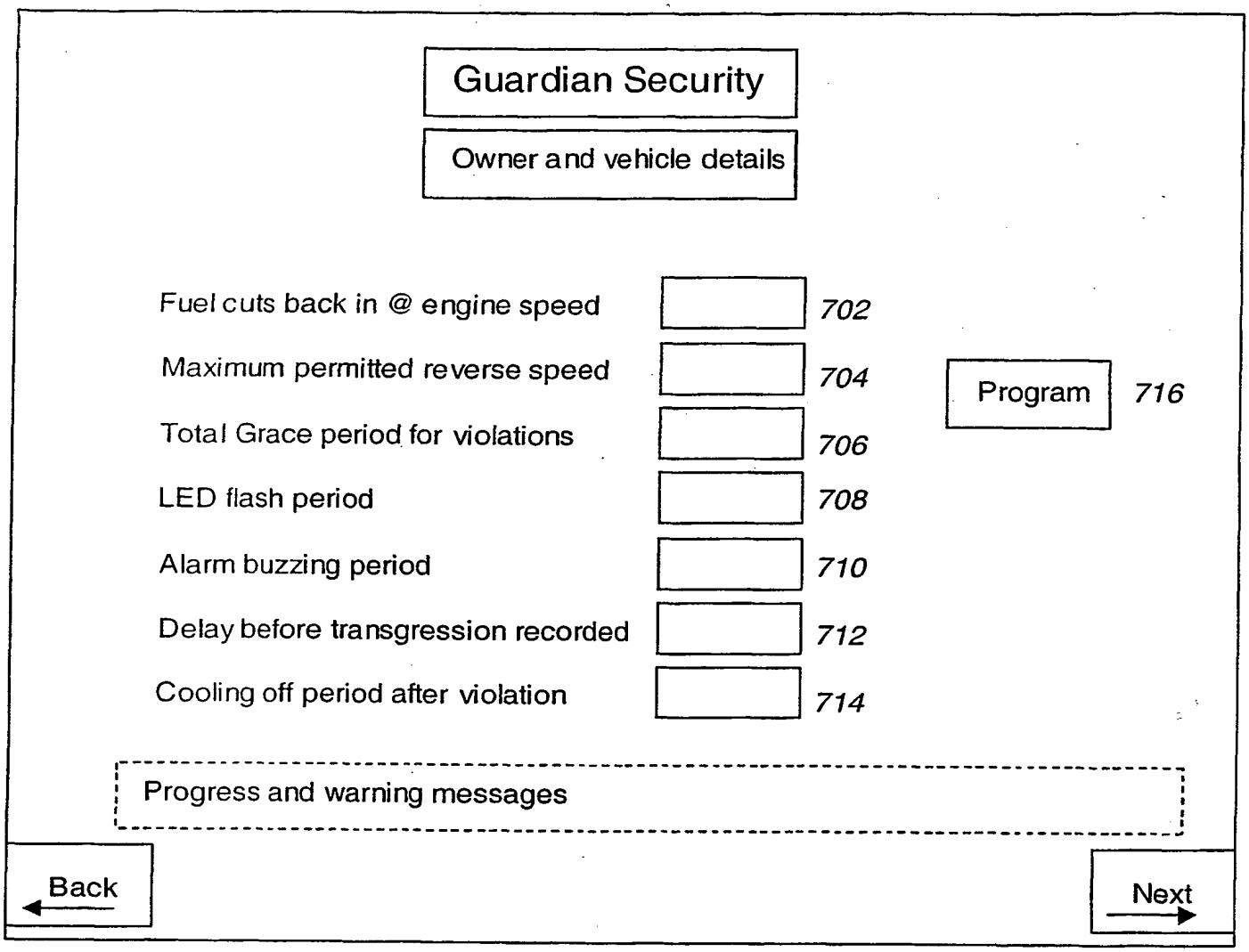

Figure 7

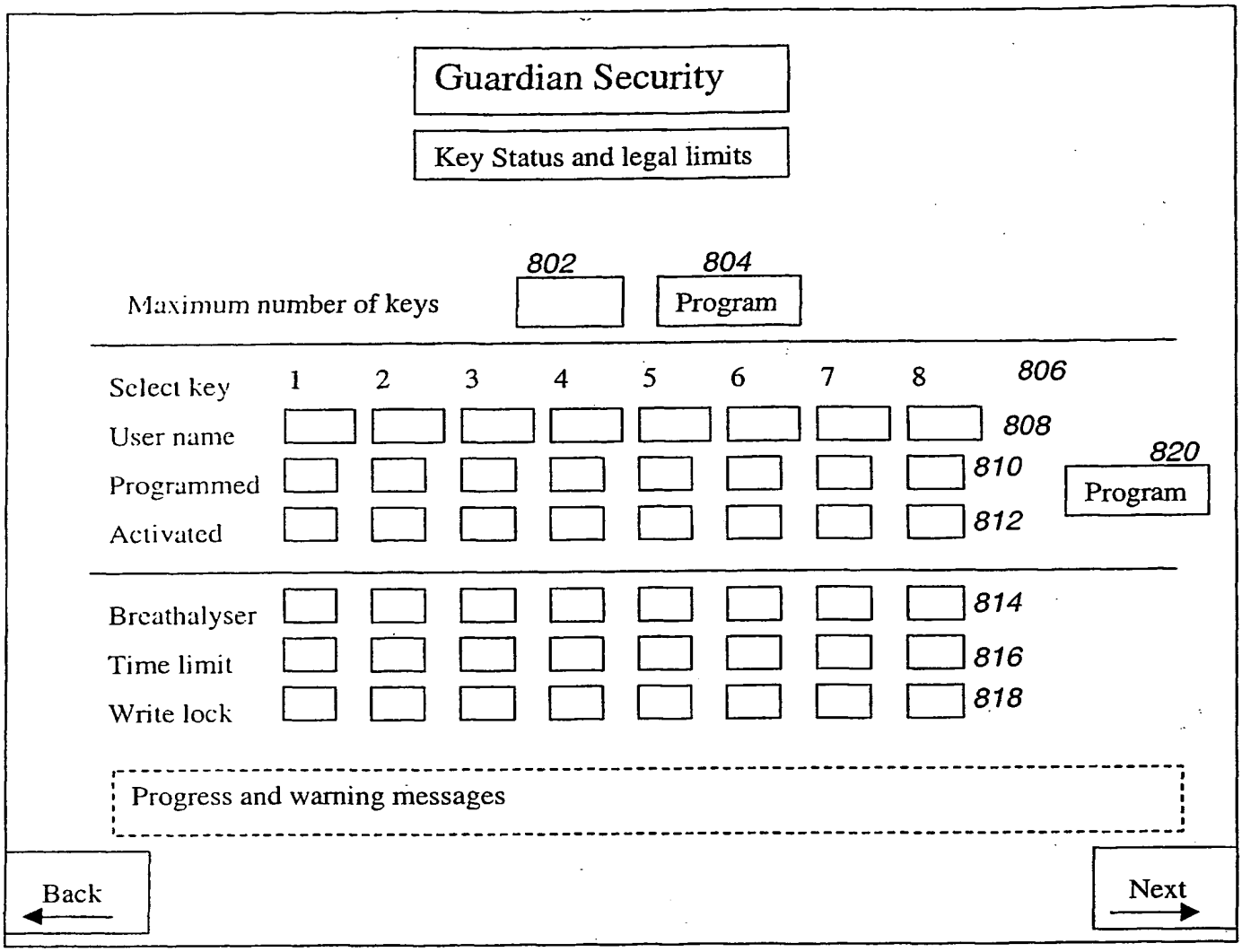
Guardian Security
Key Status and legal limits
802
804
Maximum number of keys
Program
Select key
1
2
3
4
5
6
7
8
806
User name
808
Programmed
810
820
Program
Activated
812
Breathalyser
814
Time limit
816
Write lock
818
Progress and warning messages
Back
Next

Figure 8

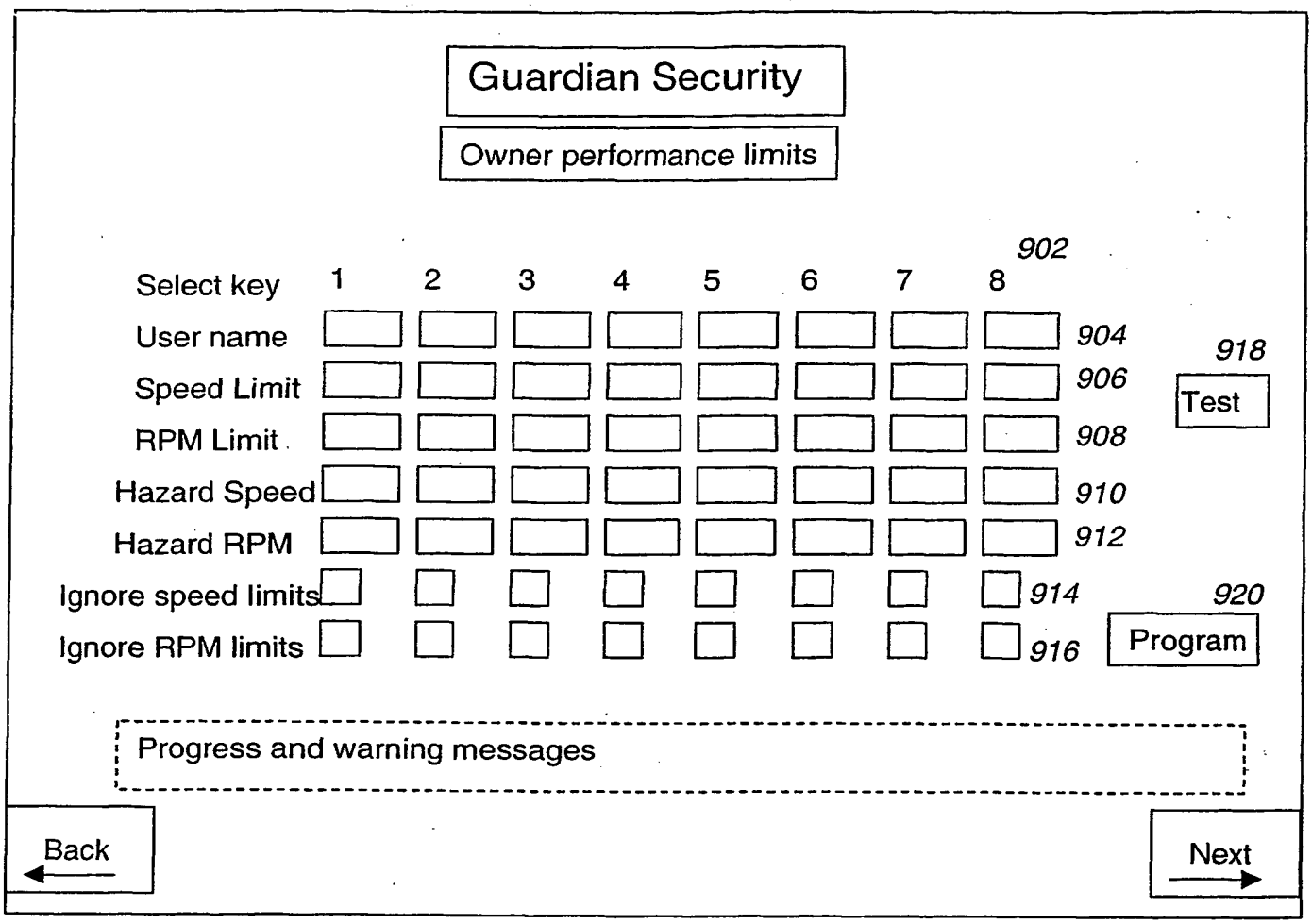

Figure 9

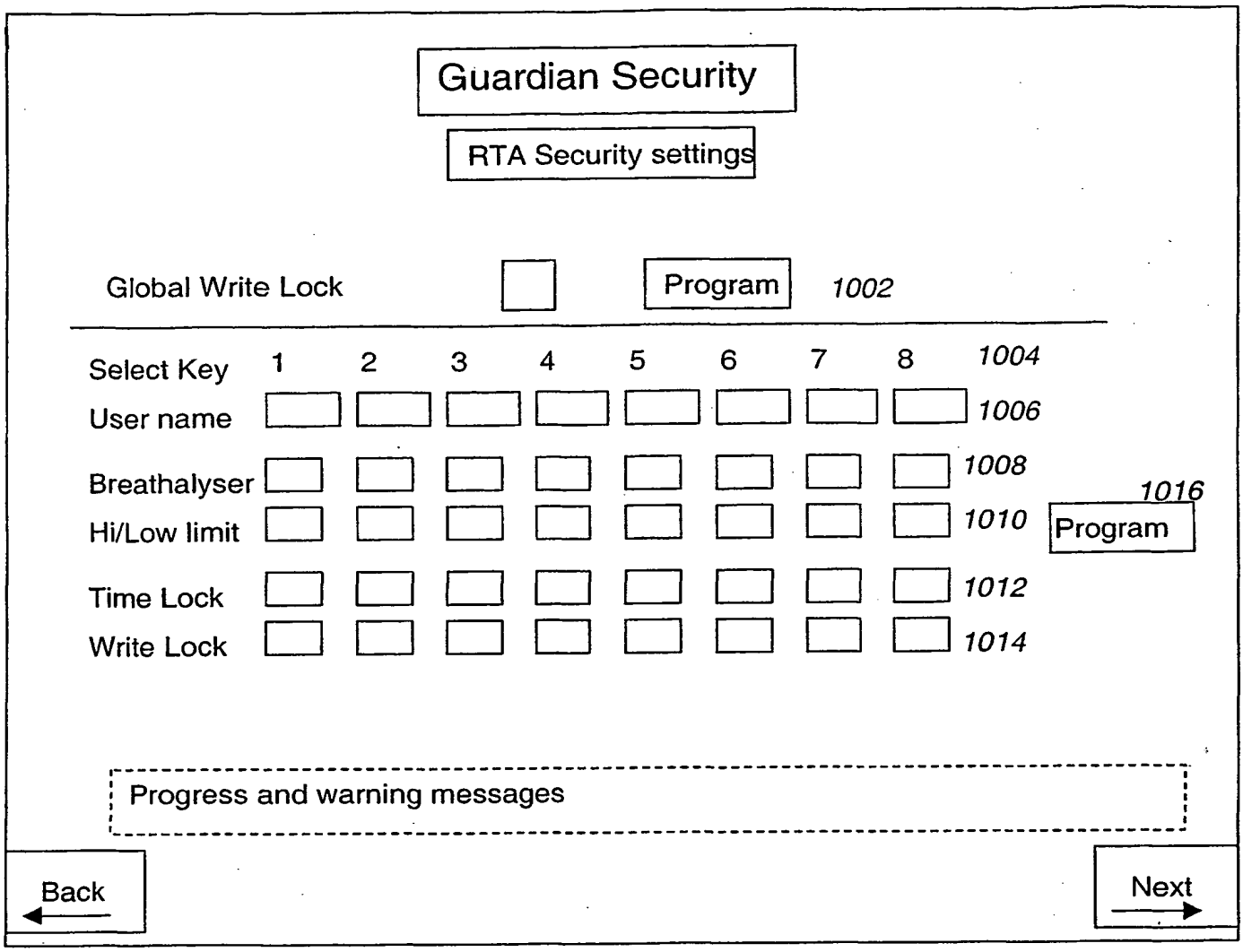

Figure 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU01/01139

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: B60R 25/00, B60K 31/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI,JAPIO: keywords :- driver(s)(identi+, authori+,securit+) and
(performance, speed etc)(s)(control+, limit+ etc) and (vehicle, automobile, car etc)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 6225890 B1 (Murphy) 1 May 2001 See the abstract	1-30
X Y	US 3878915 A (Purland et al) 22 April 1975 See the abstract	1-30 4,20
X Y	EP 178439 B1 (ANT Nachrichtentechnik GmbH) 13 November 1991 See the abstract and claims	1-30 4,20

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
23 October 2001

Date of mailing of the international search report
29 OCT 2001

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU01/01139

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 94/21483 A1 (Niukkanen et al) 29 September 1994 See the abstract	4,20
X Y	DE 4431070 A1 (Daimler-Benz Aktiengesellschaft) 7 March 1996 See the abstract	1-30 4,20
X	Patent Abstracts of Japan, JP 2000-219092 A (International Business Machine Corporation) 8 August 2000 (& US 6198996 B1, abstract, col 16 lines 18-27)	1-30

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU01/01139

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	6225890	US	6232874
JP	2000219092	US	6198996
US	3878915	NONE	
EP	178439	DE	3438385
DE	4431070	NONE	
WO	9421483	AU	37538/93

END OF ANNEX